OPERATION AND INSTALLATION MANUAL

DETAILS OF THE EQUIPMENT	
PART NUMBER:	**2360-10-0001**
DESCRIPTION:	**SV3000,SV4000 & SV6000 OPERATING AND INSTALLATION MANUAL**

APPROVALS	
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ISS	DATE	DESCRIPTION	BY	CHK
0		DRAFT FOR APPROVAL		
1		RELEASE FOR PRODUCTION		
2	30/03/10	UPGRADE TO NEW DOCUMENTATION	RH	
3				

4				
5				

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AUGUST 2008

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SAFETY AND ENVIRONMENTAL STATEMENT

1. Lethal voltages are exposed within the control unit when the top cover is removed. The unit should always be disconnected from the mains supply before removing or operating any internal components.
2. The unit should be earthed at all times.
3. The unit contains electrostatically sensitive devices (ESSD). Appropriate static protection should be used when handling subassemblies.

RELATED DOCUMENTS

Document Number	Document Title

PREFACE

This manual contains user information for the **SONAVISION** SV4000, SV6000 and SV3000 Scanning Sonars, and is divided into three sections:

Section 1	An Introduction to the **SONAVISION** 2360, 2366 and 2367 and tunable variants
Section 2	System Installation Procedures
Section 3	Operating Instructions
Appendix A only	Transducer Installation Procedure for SV4000 units Note: Transducer installation by clients must only be carried out with permission from SonaVision to avoid invalidating the warranty.

Relevant figures are provided at the rear of each section.

Should you have any comments about this manual, or the product, SonaVision are most interested in hearing from you as part of our product improvement scheme.

1.1.1

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SECTION 1 INTRODUCTION AND GENERAL DESCRIPTION

1.1 INTRODUCTION

1.1.1 Overview

Any of the SV4000, SV6000 or the SV3000 (see Figure 1.1) underwater units are a single assembly which can be mounted upright, inverted or horizontally on the vehicle.

The surface control unit and subsea unit communicate with each other via a special duplex serial link, with operational data supplied by the control unit with sonar data and heading information supplied from the subsea unit.

The SV4000 unit is capable of operating up to 1,500 metres of RG108 or equivalent. No adjustments to the system are required for different lengths of cable.

For the SV6000/SV3000 units using cable lengths in excess of 1,500 metres communications between surface control unit and subsea unit will require transmission via client supplied communication interface system.

For the subsea units to be driven from the 2055 surface units or 2054 PC Interface Boxes, note that a special version of software is fitted to the subsea processor board, it's number is 8033-XX-1000.

The subsea units should be powered directly from the vehicle with only two wires of screen twisted pair to connect the sonar communications to topside. A test cable can be ordered which would allow testing of sonar head directly from control unit or interface box.

For subsea units to be driven from 2060B, 2100 surface units or 2062, 2102 interface boxes. (Note: These units now replace all the above units as standard topsides). The software version for operation with these units can be either 8015-XX-1100 or 8033-XX-1000 but will require adjustments to the surface software selections. Refer to 2060-SOFT manual.

Note that for SV4000, SV6000 and SV3000 subsea units for the purpose of this manual are shown in all diagrams as fitted with a standard 500kHz array. It is possible for any of the above units to have an array of different operating frequencies fitted or to have a dual head or tunable version in use. These will cause the units to be visually different from the manual drawings and will affect the dimensions as seen in Figures 2.7 and 2.8.

1.1.2 Major Technical Features

The following technologies are used within the units:

- Surface Mount Technology.

- Solid State Digitally Controlled Receiver.
- Composite Transducer Arrays.

For subsea units to be driven from the older 2050 and 2050C control units power can be supplied by the vehicle or directly from the surface unit via the same screened twisted pair for sonar communications link, giving two wire operation. This method of operation is called FSK.

For subsea units being powered directly from the vehicle only two wires connect the surface unit via a screen twisted pair for sonar communication only giving two-wire operation. This method of operation is called RS422. The software version fitted to the subsea processor board is 8015-XX-1100.

1.2 SPECIFICATION

PARAMETER	500 kHz ARRAY	1MHz PROFILE ARRAY	200kHz ARRAY
Beamwidth Horz. Vert.	 2.1° 27.0º	 1.7° 1.7°	 3.0° 20.0°
MDS	≤74dB	≤74dB	≤74dB
Source Level	210dB/µPa re/1m	210dB/µPa re/1m	210dB/reµPa @/1m
Pulse Length	100µsec	100µsec	100µsec
Bandwidth	10kHz	10kHz	10kHz

PARAMETER	325kHz-675kHz Tunable Array		250kHz-500kHz Tunable Array	
	At 325kHz	At 675kHz	At 250kHz	At 500kHz
Beamwidth:- Horz. Vert.	 3.3º 41º	 1.6º 19.5º	 2.6º 30º	 1.3º 15º
MDS	80max	83max	80dB	82dB
Source Level	210Typ	212Typ	210 (min. 207)	212
Pulse Length	100µsec	100µsec	100µsec	100µsec
Bandwidth				

Depth:		1,000 metres UNIT 2360 and variants	
		6,000 metres UNIT 2366 and variants	
		3,000 metres UNIT 2367 and variants	
Temperature:	Operating:	0℃ to +40℃	
	Storage:	-20℃ to +60℃	
Material:		uPVC Transducer Head Titanium body	
Power Consumption:		15 Watts	
Power Supply:		18-32 Volts (from vehicle)	
Weight:		In Air	In Water
	SV4000	7.7kg	3.5kg
	SV6000/SV3000	12.4kg	7.5kg
Size: mm	SV4000	390(long) x 107(diameter)	
	SV6000/SV3000	465(long) x 107(diameter)	
mm			

Umbilical Length: SV4000 unit 1,500 metres of RG108 or similar twisted pair with a d.c. loop resistance of less than 220 ohms.

SV6000/SV3000 unit using lengths in excess of 1,500 metres, communications between surface control unit and subsea unit will require transmission via client supplied communication interface system.

1.3 OVERALL SYSTEM DESCRIPTION, see Figure 1.2

The system consists of two units, the surface control unit and the subsea unit.

The interconnection will depend on which combination of the surface and subsea units are to be used.

Older systems will have provision to be used in two modes either FSK or RS422 operation while the newer systems will not have the provision to operate FSK from the topside units. The subsea unit will still have the ability to operate on older systems with a software change.

The surface unit sends telemetry information to the subsea unit including range, gain, sector centre, motor speed, transmit command, etc. The subsea unit responds with the received sonar data and head orientation.

The subsea unit uses the information supplied from the surface to control the operation of the motor, the transmit pulse and the receiver gain.

The surface control unit processes the received sonar data, displays it and then sends any status changes to the subsea unit along with the next transmit command.

The user can initiate status changes via the controls on either the front panel, the remote unit or by utilising the software controlled menu system.

FIGURE 1.1

SV4000/SV6000/SV3000 SUBSEA UNITS

SV6000/SV3000 SV4000

2 FIGURE 1.2

SYSTEM DIAGRAM

SECTION 2 SYSTEM INSTALLATION

2.1 INTRODUCTION

This section details the installation procedure required for the SV4000/SV6000/SV3000 units. Each unit is checked prior to shipment.

2.2 UNPACKING PROCEDURE

The unpacking procedure is as follows:

a) Remove the unit from its transit case.

b) Check that the contents of the case conform to the packing notes.

c) Visually inspect the unit for transit damage.

d) Notify the manufacturer of discrepancies and/or transit damage.

e) Retain the transit case for future shipment.

2.3 INSTALLATION

Subsea Unit - See Figure 2.1 and Figure 2.2

To install the subsea unit on an ROV, proceed as follows:

The subsea unit is connected to the vehicle umbilical, via the 2 metre subsea cable whip, part number 2238-2001 and is normally supplied with no termination.

a) Using an M5 Allan key, remove the cover plate from the connector on the subsea whip and remove the sealing boot from the bottom of the unit.

b) Check and clean the subsea unit mating area around the connector and clean and grease (Silicon Grease, Dow Corning MS4 Silicone Compound or equivalent) the face and piston o-rings on the cable whip connector.

c) Bring the two connectors together, aligning the whip dowel pin to the subsea unit dowel hole.

d) Secure connector with the 3 X M5 screws provided on removing the connector cover plate with Allan key.

NOTE: Please ensure that the three cap screws are tightened equally thus ensuring correct bottoming of the connector and that the back up ring is not trapped across a mating surface.

e) The open end of the interconnecting cable should be terminated to an appropriate underwater connector and connection made to the host vehicle, see Figure 2.5.

When operating from vehicle power the following connections only should be made:

SIGNAL NAME	PIN No
RS422+/RS485+	2
RS422-/RS485-	5
+24V	3
0V	4

This option may be used in combination with a 2050C, 2055 or a 2060 control unit.

When operating from a 2050 surface control unit power the following connections only should be made:

SIGNAL NAME	PIN No
CC+	6
CC-	1

This option is only valid with a 2050 control unit but not with 2050C, 2055, 2060B or the 2100.

CAUTION

Ensure the underwater unit is securely mounted and all connectors are fully home and secured.

When the underwater unit is installed on a platform other than an ROV, contact factory for details of necessary connections.

2.4 PRE-DIVE CHECK

2.4.1 SV4000 Unit

The subsea unit should be washed with fresh water after each recovery to remove seawater, mud, silt and any other contaminants.

Also check pre-charged seal indicator pin, see Figure 2.6, has not fallen to below 5mm from the surface of the end cap. If it has, follow charging procedure, Section 2.4.2.

The subsea unit contains a high performance rotating seal mechanism, incorporating an active compensation device. This seal is pre-charged with lubricant and for this reason it is important that the components are not removed or loosened in any way, as any such action would result in a de-pressurisation of the compensator and risk a possible premature failure of seals flooding the sonar.

2.4.2 SEAL RE-CHARGING PROCEDURE - see Figure 2.6

The procedure for re-charging the seal assembly is as follows:

a) Remove the filter port plug (diametrically opposite the indicator) to expose the grease nipple.

b) Connect a grease gun, charged with SHELL ALVANIAN MULTI PURPOSE GREASE, to the grease nipple.

c) Begin to charge the unit from the grease gun, observing the position of the indicator.

d) Stop filling when the indicator is 1-2mm below the surface of the end cap.

e) Remove the grease gun.

f) Pack the filler port with grease and **replace the plug.**

Note: If the grease cover is not tightened, there is a risk of flooding to the sonar.

2.4.3 SV6000/SV3000 UNIT

The subsea unit should be washed with fresh water after each recovery to remove seawater, mud, silt and any other contaminants.

Inspect the indicator pin in the centre of the transducer cover plate (see Figure 2.2). This pin should be near flush with the cover, but must not be more than 3mm below the surface.

If the indicator pin is below the above level, the unit must be returned to SonaVision Limited or an approved service centre for maintenance. (See manufacturer for details).

2.4.4 SEAL LIFE

The shaft and seal sleeve are designed for a service free maintenance period of 2,000 hours in normal operating conditions.

SonaVision recommend component replacement at 2,000 hour intervals, or every two years (whichever is sooner) by returning the unit to our Service Department or an approved service centre for inspection and refurbishment.

FIGURE 2.1

3 SV4000 UNIT SUBSEA INSTALLATION DRAWING

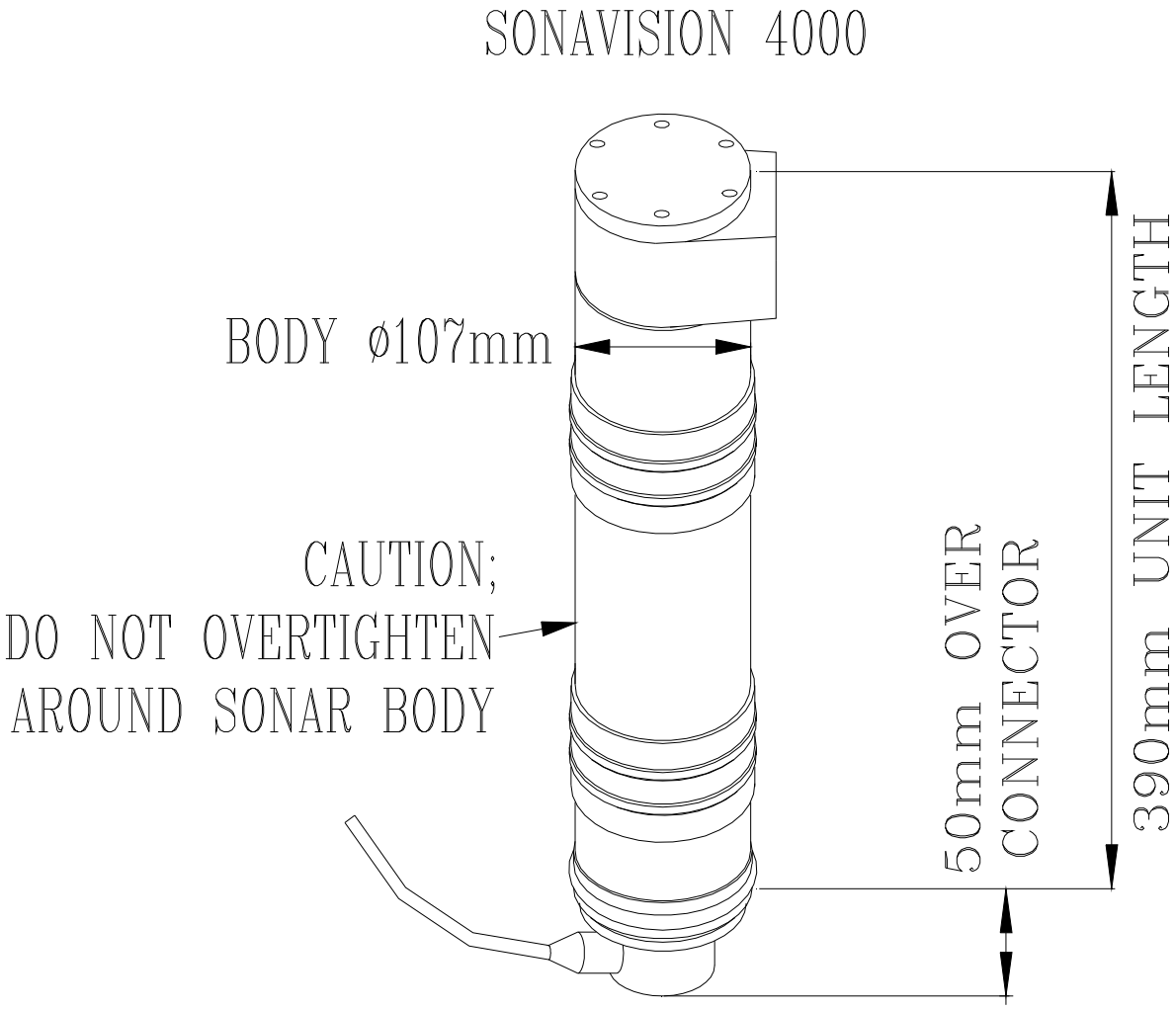

FIGURE 2.2

SV6000/SV3000 UNIT SUBSEA INSTALLATION DRAWING

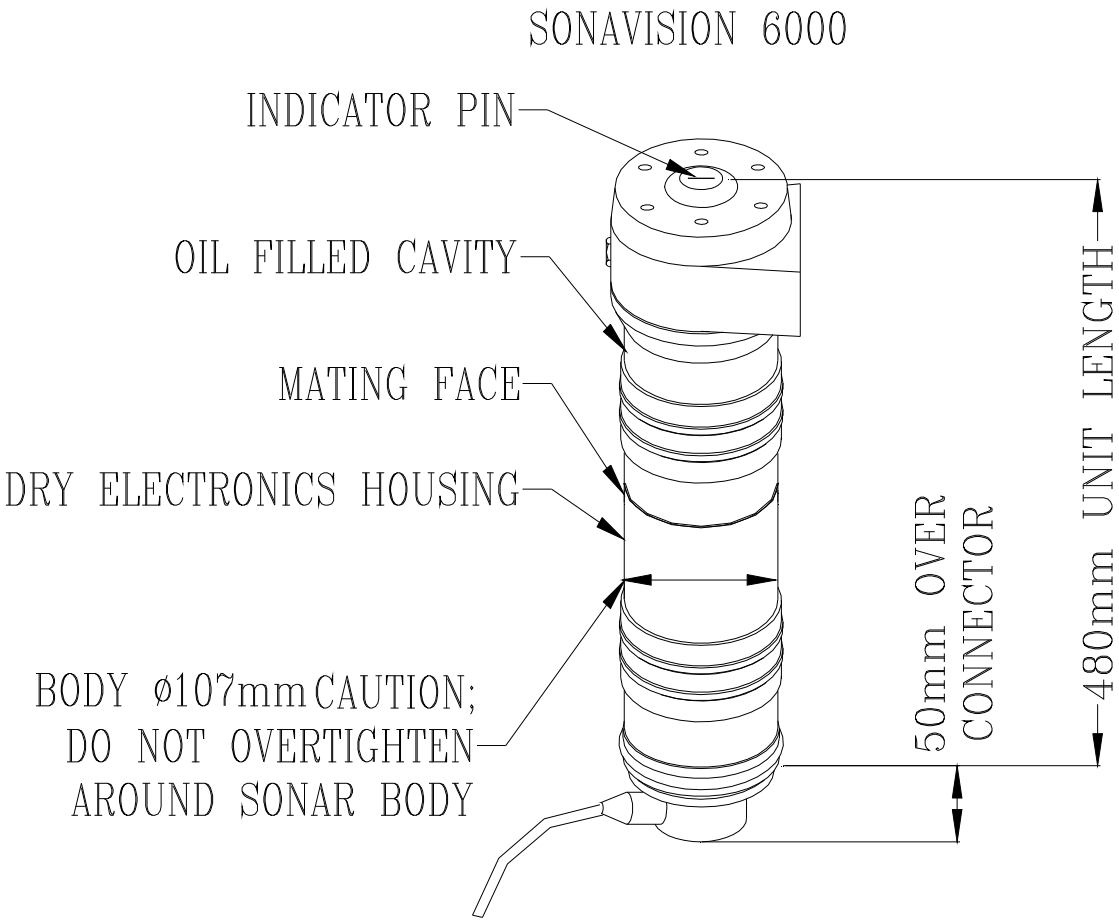

FIGURE 2.3

TRANSDUCER ORIENTATION SV4000 UNIT

FIGURE 2.4

TRANSDUCER ORIENTATION SV6000/SV3000 UNIT

FIGURE 2.5

SUBSEA TO HOST VEHICLE CONNECTIONS

FIGURE 2.6

GREASE INDICATOR POSITION

APPENDIX A

TRANSDUCER HEAD INSTALLATION PROCEDURE

This procedure describes the actions necessary to install an optional frequency transducer head on the SV4000 Sonar. The kit consists of the transducer head and a pre-amplifier.

As the SV6000 and SV3000 are oil filled they must be returned to SonaVision or an approved service centre for a transducer change.

Before commencing, ensure all power is removed from the system.

The procedure is divided into two sections. Section One concerns fitting the transducer head onto the transducer unit. Section Two describes how to change the configuration of the surface control unit tog generate the required transmission frequency.

A-1.0 CHANGE THE TRANSDUCER HEAD - see Figure 1

a) Remove the six M4 cap screws securing the cover plate, and lift off the cover plate.

b) Remove the two M3 cap screws securing the pre-amplifier and gently prise out the board. Store the board in a package providing electrostatic protection.

c) Remove the two M2.5 counter-sunk screws securing the slipring connector bracket and lift the bracket and connector clear.

d) Remove the four M4 cap screws securing the transducer head to the flange and lift the head clear.

e) Clean, grease with Dow Corning MS4 Silicone Compound (or equivalent) and replace the o-ring and replace in the flange.

f) Place the new transducer head on the flange, ensuring that the dowel pin locates in the keyring hole in the underside of the head.

g) Secure the transducer head by fitting and tightening the four M4 cap screws.

h) Position the slipring connectors' bracket in the head cavity and secure with the two M2.5 counter-sunk screws.

NOTE: Take care not to pinch the conductors when fixing the connector bracket. Route the cables in a gentle loop around the mounting pillar.

I) Gently fit the new pre-amplifier onto the leads mating it to both the slipring and array ensuring that that array wires (coloured) are fitted to PL2 and the slipring wires (white) are fitted to PL1.

Secure the board with the two M3 cap screws.

j) Clean, grease with non-silicon based grease and replace the o-ring and replace in the cover plate.

k) Position the cover plate on the transducer head, align the fixing holes, fit and tighten the six M4 cap screws to secure the cover plate.

FIGURE A-1

SUBSEA UNIT SUB-ASSEMBLIES

END OF DOCUMENT